A Work Project, presented as part of the requirements for the Award of a Master's degree in Management from the Nova School of Business and Economics.

Carbon Credit Card Services and the Impact Potential on CO2 Emissions in the EU – Climate Crisis Analysis and the Relevance of Sustainable Finance

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Abstract

This section analyzes how climate change awareness and political initiatives evolved over the past decades and what role Carbon Credit Card Services (CCCS) play among current decarbonizing initiatives. To answer these questions, factors causing climate change and resulting consequences from an ecological, societal and economic perspective were identified. The study shows the need for climate change mitigation initiatives on three layers: governments, corporations and consumers. The results reveal that among the corporate side, the financial sector plays a significant role in the transition to carbon-neutrality. The specific impact of Carbon Credit Card Services will be further investigated within a thought experiment in the following sections.

Keywords

Carbon Credit Card Services (CCCS)

Carbon Emissions

Climate change

Financial Industry

Greenhouse Gas Emissions (GHG)

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Abstract – Climate crisis analysis and the relevance of sustainable finance

This section analyzes how climate change awareness and political initiatives has evolved over the past decades and what role Carbon Credit Card Services (CCCS) play among current decarbonizing initiatives. To answer these questions, factors causing climate change and resulting consequences from an ecological, societal and economic perspective are identified. The study shows the need for climate change mitigation initiatives on three layers: governments, corporations and consumers. The results reveal that on the corporate side, the financial sector plays a significant role in the transition to carbon-neutrality. The specific impact of Carbon Credit Card Services will be further investigated within a thought experiment in the following sections.

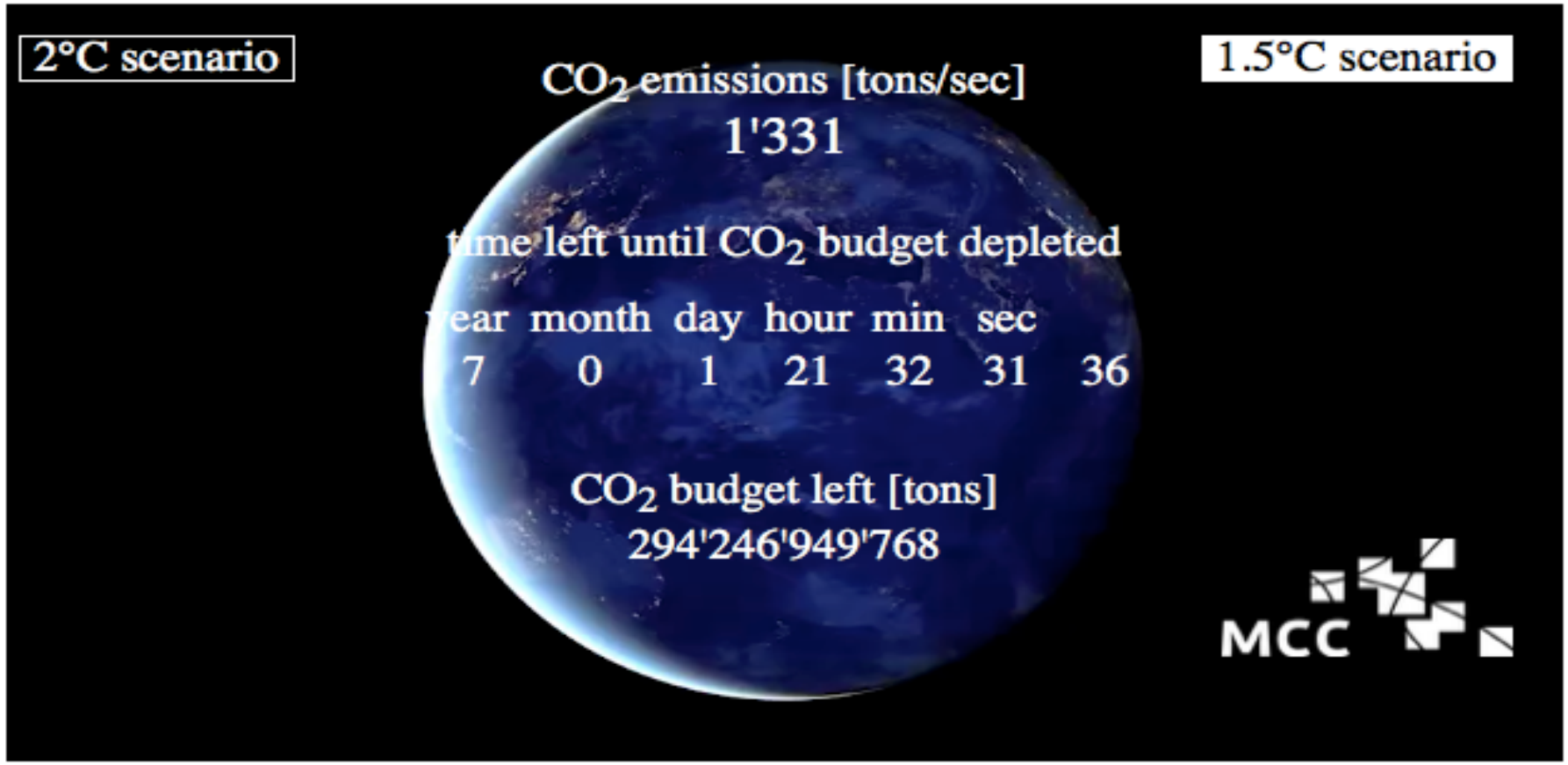
Section 1: Climate crisis analysis and the relevance of sustainable finance

Sections	Research questions	Methodologies
Key Question	**How has the downfall of planet earths' health led to the uprising of climate awareness?**	
1.1 Problem Outline	**Climate change – Where are we standing right now and what have we done so far?** ➢ How have climate change awareness and political initiatives evolved over the past 80 years? ➢ What are main Greenhouse Gases and how have they evolved over the past three decades?	> Literature review > Secondary data > Timeline
1.2 Responsible Behavior	**What behaviors are responsible for the ongoing climate crisis?** ➢ Governmental ignorance and political constraints ➢ Corporate's blind-eye in favor of profitability ➢ Consumer's ignorance and constraints	> Literature review > Secondary data
1.3 General Consequences	**What are the consequences of climate change?** ➢ Ecological consequences ➢ Societal consequences ➢ Economic consequences	> Literature review > Secondary data
1.4 Problem Mitigation Initiatives	**What role do carbon credit card services play among current decarbonizing initiatives?** ➢ Overview of initiatives across the three levels (government, corporate, consumer) ➢ Why is the financial industry an important sector and which initiatives are available?	> Literature review > Secondary data > Strategic foresight

Climate Crisis - Call to Action

Carbon emissions do not sleep: with the 1.5°C scenario in mind the remaining carbon budget is depleted within 7 years

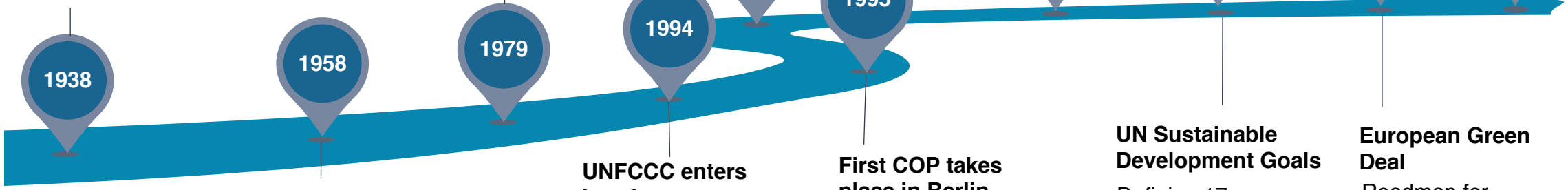
Live carbon budget countdown



Source: Mercator Research Institute on Global Commons and Climate Change (2020).

A glance at the historic development of climate change investigation reveals early awareness yet insufficient actions

Climate change awareness and political initiatives: Historical Roadmap



First GHG model

Guy Calendar develops the first GHG model and concluded that humans can increase temperatures by emitting GHG

The Keeling Curve: First Carbon Measurement

The Keeling Curve is a graph that depicts the ongoing change in atmospheric carbon dioxide since 1958

World Climate Conference in Geneva

One of the first major international conference on climate change. It led to the establishment of the World Climate Program

UNFCCC enters into force

An international environmental treaty addressing climate change, negotiated and originally signed by 154 United Nations states

Kyoto Protocol & EU ETS enter into force

Mandatory cut of CO_2 emissions; established market mechanisms to trade emission permits

First COP takes place in Berlin

Climate conventions are deemed inadequate. Establishment of processes for stronger climate commitments

Signature of Paris Agreement

Limit global temperature increase to 1.5°C

UN Sustainable Development Goals

Defining 17 core sustainable development goals (SDG)

European Parliament declares climate emergency

The European Parliament wants to be fully aligned with limiting global warming to less than 1.5°C

European Green Deal

Roadmap for Europe becoming a climate-neutral continent by 2050

Source: Spencer Weart & America Institute of Physics (2020), Harvard (2020) and European Parliament (2020).

Among the historical governmental climate actions the Paris Agreement is a major milestone for the decarbonization until 2030

Paris Agreement: Three key climate and energy objectives and their reciprocal interaction

Renewable energy target (RES)

At least **32% increase** of renewable energy of gross final energy consumption

- Investments support **renewable energy implementation**
- **Increased renewable energy** results in lower primary energy production

Greenhouse gas target (GHG)

At least **40% reduction** of the EU's domestic GHG emissions (compared with 1990 levels) by 2030

- Reduced fossil fuel use leads to **reduced GHG emissions**
- Reduced energy consumption leads to **lower GHG emissions**
- Increased use of biomass **decreases GHG emissions** and promotes the accomplishment of renewable energy target

Energy efficiency target (EE)

At least **32.5 % improvement** in energy efficiency by 2030 at EU level

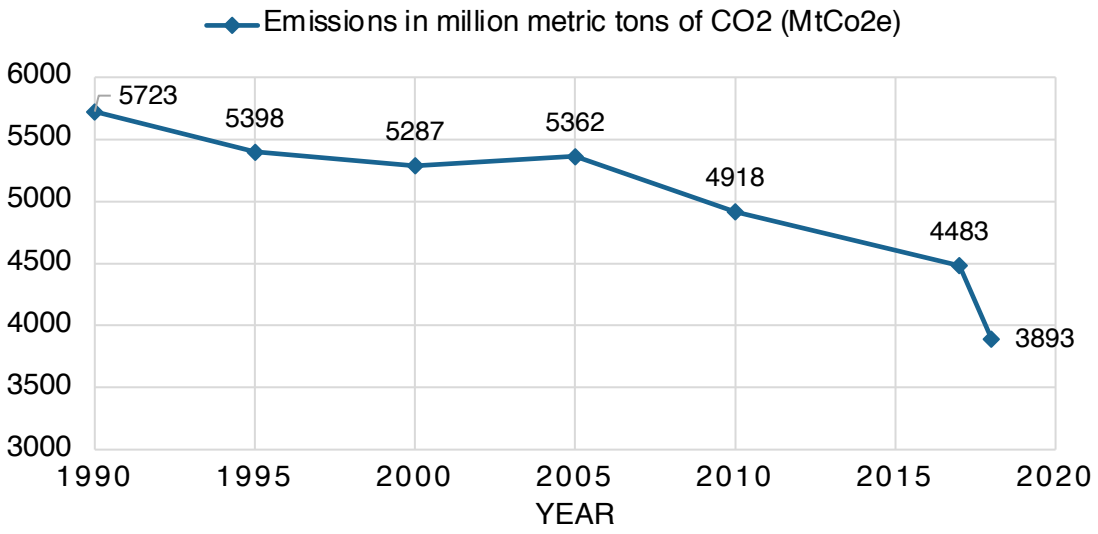
- Investments and behavioral change results in **reduced energy consumption**
- **Reduced energy consumption** results in lower need for renewables to reach the renewable target

Source: European Environment Agency (2019a).

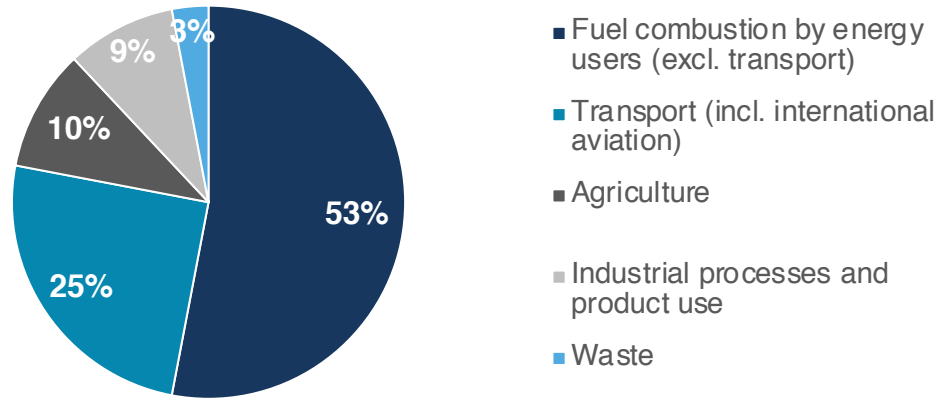
The ongoing downfall of planet earth's health caused by high-level greenhouse gas emissions constitutes a significant risk for the future of mankind

Main Greenhouse Gases and their evolution over the past three decades

Total Greenhouse Gas Emissions in the EU from 1990 to 2018



Greenhouse Gas Emissions, analysis by source sector, EU, 2018



The reduction rate of GHG is not enough

- **Carbon dioxide (CO2)** lingers in the atmosphere for hundreds of years
- If emittance of CO2 came to an end today, global warming would remain for decades due to the **lag between human action and the planet's response**
- As a result, it becomes **more important than ever to respond to climate change** before its effects become irreversible

The four main GHG responsible for global warming

- **Carbon dioxide (CO2)** is responsible for 64% of all **GHG emissions**. Other GHG are emitted in smaller quantities but instead trap heat more effectively than CO2
- **Methane** is responsible for 17%
- **Nitrous Oxide** is responsible for 6%
- **Fluorinated Gas** is responsible for 3%

Source: Statista (2020b), European Commission (2020a), NASA (2020) and Eurostat (2020a).

The late response towards the constantly increasing problem was fueled by governmental ignorance and political constraints

Flawed public policy measures as a major factor causing climate change

Failure of national politics

China: Economic growth over climate action

China's greenhouse gas emissions increased by **80%** between 2005 and 2018 and are currently responsible for **27%** of global CO2 emissions

USA: Paris Agreement unfair according to the US

Responsible for **13%** of global CO2 emissions. The withdrawal from the Paris agreement came into effect November 2020 under the Trump administration

Russia: Fossil dependency

Two-thirds of Russian export was fossil fuel dependent in 2019. The fifth largest GHG emitter formally joined the Paris agreement four years after its creation

Failure of global politics

COP15

$100B in yearly climate aid to developing countries are not met yet renewed each year without delivering

The Paris Agreement

128 of the total **184** climate pledges were deemed insufficient in a recent report from FEU-US

COP25

Unable to reach an agreement on how to regulate carbon markets, the issues were postponed to COP26

Source: Euractiv (2019) and FEU-US (2020).

On corporate-side, the issue is accelerated by a short-term mindset and blind-eyes of businesses in favor of profitability

Corporate's blind-eye in favor of profitability as a major factor causing climate change

Shareholder pressure

- Shareholder's pressure of quarterly growth
- Corporate social responsibility still presents a naturally weak business case

Outdated business models

- Encouraging costumers to consume less is true sustainability
- Need for updated business objectives

Lack of Knowledge

- Fixed and short-term mindsets, lack of incentives for managerial change and knowledge gaps as main triggers for the ignorance on corporate level

Greenwashing

- Behavior or activities that falsely make the impression that a company is doing more to protect the environment than it really is
- Short-term strategy

Possible mitigation actions

Acknowledge financial investment trends

Recognize the need for decreased consumption

Sustainable employee education and incentives

Stop green washing and start green blushing

Short-term outcomes

- Shareholder dissatisfaction
- Decreasing revenues
- Increasing costs

Barriers

- Lower generation of cashflows
- Decreasing share price
- Lower profitability

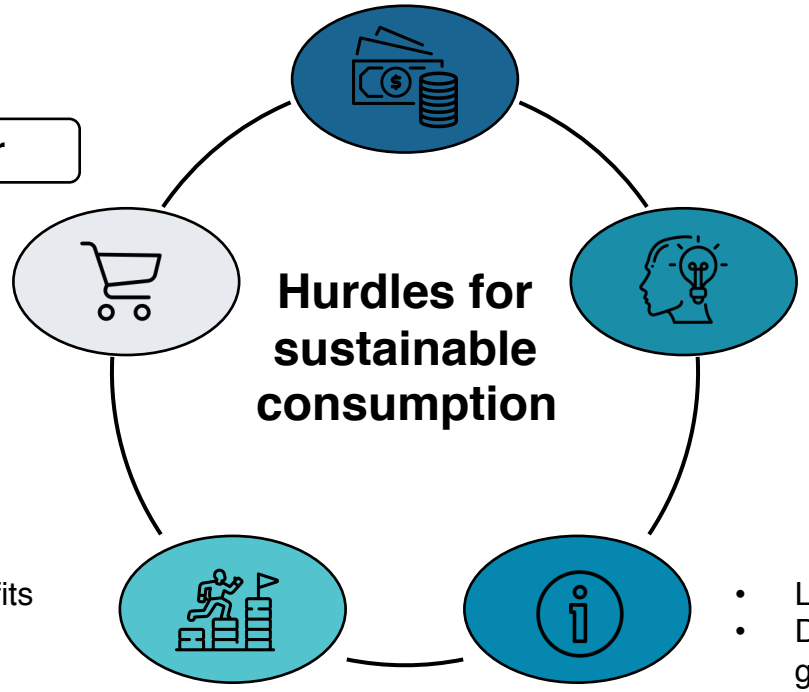
Source: IMD (2012), Cambridge Dictionary (2020) and Ivey Business Journal (2011).

The high level of ignorance connected to lack of information and awareness has caused consumers not to take environmental impact into consideration

Consumer's ignorance and constraints as a major factor causing climate change

Price point

- Price point is a deciding factor
- Value for money & quality are more important than sustainable production



Inconsistent sustainable purchase behavior

- 65% want to purchase from sustainable brands but only 26% do so
- Irrational and spur of the moment sustainable purchases

Distorted self-image

- Tendency to falsely rate oneself as more environmentally friendly than others
- Diminishing one's own impact potential

Lack of motivation

- Difficulties in seeing long-term benefits
- Selfish mindset

Lack of information

- Low visibility of company supply chains
- Distorted images through company greenwashing

Source: Institute for Human Resource Education and Management, Munich School of Management (2019).

The beforehand mentioned behaviors have led to substantial ecological consequences on a global scale

Ecological consequences of climate change

SEA-LEVEL

+25

- centimeters increase from the late 19th to the early 21st century
- **Impact** on marine ecosystems: devastating erosions, wetland flooding aquifer and agricultural soil contamination with salt, and lost natural environment for flora and fauna

TEMPERATURE

+1,0

- degrees Celsius increase by 2020 compared to pre-industrial times worldwide
- **Impact:** Death of thousands of Adelie penguins due to hunger and the unusual expansion of the ice pack, altered flora, coral bleaching due to a warmer and more acidic sea

NATURAL DISASTERS

829

- natural disasters in 2019, three times more than thirty years ago
- **Impact:** Tohoku earthquake and tsunami in Japan in 2011 as most costly natural disasters in modern history: economic impact estimated at around $210 billion

RAINFOREST

300

- soccer fields (equivalent for rainforest area) are being destroyed in every hour
- Primeval forests are ecologically valuable as they present a high biodiversity and store large amounts of CO2
- **Impact:** Deforestation of rainforests destroy the ecological value. Hence, less resources exist to absorb carbon emissions

Source: Statista (2020a), Church, J. A. & White, N. J. (2011) and National Geographic (2020)

The resulting problems have also impacted structures and circumstances of societies across the globe

Social consequences of climate change

Large inequality in international and intranational energy footprints between income groups and across consumption categories:

- **Outcome:** The wealthiest 10% of people consume around 20 times more energy than the poorest 10%
- As income increases, richer people spend more money on **energy-intensive goods**

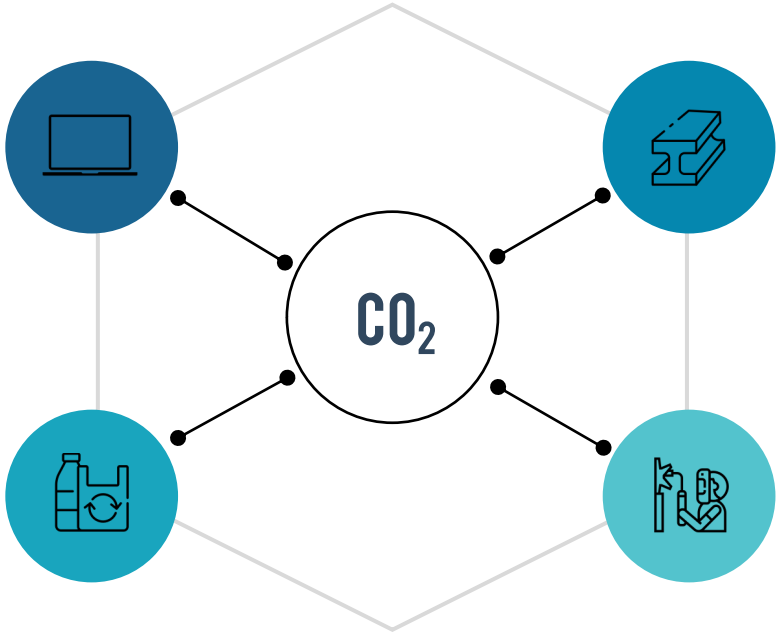
Outsourcing of waste management

Electronic waste

- By 2020, e-waste will increase by 500% in India, and by 200-400% in South Africa and China which leads to health problems for backyard recyclers

Plastic

- In 2019, the EU exported around 150,000 tons of plastic waste per month
- Deposits of plastic and microplastics are polluting rivers and oceans worldwide



Outsourcing of production

Steel production

- Many wealthy countries are outsourcing a big amount of their carbon emissions by importing steel from China, rather than producing it domestically

Aluminum production

- Many wealthy countries are outsourcing GHG emissions by importing Aluminum from China. In 2019, China had a total smelter production of 36 million tons of aluminum

Source: University of Leeds (2020), United Nations Environmental Program (UNEP) & United Nations University (UNU) (2009) and European Environmental Agency (2019b).

Historical cost savings on the bill of nature are now to be resolved by highly-complex and cost-expensive actions to tackle climate change

Economic consequences of climate change

Investments between US$1.6 trillion and US$3.8 trillion per year will be needed globally over the next 30 years for climate mitigation actions

Five main energy transition options

Renewable energy electricity expansion	Coal phase-out	Decarbonize transport	Decarbonize industry	Avoid future emissions and energy access
• Transition to **renewable energy** • Proportion of renewable energy in electricity up to **85%** by 2050	• Plan and implement **phase-out of coal** • Expand carbon capture usage and storage systems • **Carbon pricing**	• Focus on **electric mobility** • Fuel substitution **(bioenergy, hydrogen)**	• **Demand reduction** for an industrial product • **Energy-efficiency** improvements • **Electric production** of heat • **Biomass** and hydrogen usage • **Carbon capture**	• **Combine energy access** with emission reductions for 3.5 billion people who lack access to electricity • **SDG 7:** commits the world to ending energy poverty by 2030

Source: UN Environment Programme (2019) and McKinsey & Company (2018).

Relevance of Sustainable Finance

Among the layers of governments, corporates and consumers, there is however an increasing minority aiming to tackle the climate crisis

Examples of initiatives across the three levels: government, corporates, consumers

Government
EU Commission

- **High-Level Expert Group on Sustainable Finance (HLEG):** 20 senior experts from civil society, finance sector, academia and observers from European and international institutions

➢ **Impact:** Advising the EU Commission on how to steer the flow of public and private capital towards sustainable investments

Corporates

Automotive industry

- **ELLI:** VW has established its own **green energy provider**, offering home charging with green electricity
- **MOIA:** Volkswagen offers a **fully electric ride pooling shuttle** in Germany

➢ **Impact:** Support the switch to e-mobility and avoid emissions in urban areas

Fashion industry

- **H&M and Zara** launched **in-store recycling initiatives**, which allow customers to drop off unwanted clothes in fashion bins

➢ **Impact:** Encouragement of recycling and reduction of waste

Consumers
Foundations

- **Gulbenkian Oceans Initiative (GOI)**: Research project in Portugal with the vision of protection, conservation and good management of the oceans and marine ecosystems
- **Fridays For Future:** Global student movement pushing for immediate action on climate change

Source: European Commission (2020b), Volkswagen AG (2020a), Volkswagen AG (2020b) and Calouste Gulbenkian Foundation (2017).

As an industry that interrelates with all industries worldwide, the financial sector plays an important role by establishing new initiatives

Examples of decarbonizing initiatives in the Financial industry

Financial industry

Sustainable Responsible Investing (SRI)

ESG Investing

Integration of environmental, social, and governance (ESG) factors in financial investment decisions

Green Bonds

Fixed-income instrument issued specifically to investors to support specific climate-related or environmental projects

Sustainable Credit Cards

The Clean Water Card

Visa Platinum Card for Clean Water Action. The card supports clean water and healthy communities

Baltic Sea Card

Biodegradable 'Support The Baltic Sea' Credit Card launched by the Finnish bank Ålandsbanken

Carbon Credit Card Services

Banking service that enable users to track their C02 emissions and compensate for their impact with carbon offsetting

Source: PYMNTS (2020), Investopedia (2020a) and Investopedia (2020b).

By shifting the horizon away from the short-term mindset, the financial industry can become a powerful force in the transition to carbon-neutrality

Relevance of the Financial sector in the fight against climate change

Why does Sustainable Finance play a significant role in the transition to carbon-neutrality?

Re-orient investments
Towards more sustainable technologies and business

Finance long-term growth
in a sustainable way

Low-carbon Economic Transition
contribute to the establishment of a climate-resilient economy

Carbon Credit Card Services

Why will the financial industry be important in the future?

The financial industry
is present in every business activity

Economic Opportunities
Investments in renewable energy technologies, energy efficiency projects etc.

Mitigation of Economic Risks
caused by climate change by providing appropriate products and services

Carbon Credit Card Services

Source: European Commission (2020) and Allianz & WWF (2005).

Key takeaways - Context

Sections	Main Insights
Key Question	**How has the downfall of planet earths' health led to the uprising of climate awareness?**
1.1 Problem Outline	**Evolvement of climate change awareness and political initiatives over the past 80 years:** ➢ **Paris Agreement:** Target to reduce at least 40 % of the EU's domestic GHG emissions by 2030 ➢ **Problem outline:** GHG emissions are globally decreasing but at a rate too slow
1.2 Responsible Behaviors	**Three layers responsible for climate change:** ➢ **Governments** – Ignorance and political constraints ➢ **Corporations** – Blind eyes in favor of profitability ➢ **Consumers** – Lack of information and distorted self-image
1.3 General Consequences	**The general consequences can be divided into three areas:** ➢ **Ecological** – Global environmental issues such as rising temperatures and sea-levels ➢ **Societal** – Outsourcing of waste management and carbon emissions from production ➢ **Economic** – Need of investments between US $1.6 and 3.8 trillion in yearly climate mitigation initiatives
1.4 Problem Mitigation Initiatives	**Climate change mitigation initiatives by governments, corporations and consumers:** ➢ On the corporate side the **financial sector** plays a significant role in the transition to **carbon-neutrality** ➢ Carbon Credit Card Services is one of these financial initiatives and the focus of the **following research analysis**: **'Carbon Credit Card Services and the impact potential on CO2 emissions in the EU'**

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